

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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SERIAL NO.: 10/720,579 ART UNIT: 1753

FILED: November 24, 2003 EXAMINER: Wong, E.

TITLE: METHOD FOR MANUFACTURING VERY LOW ROUGHNESS
ELECTRODEPOSITED COPPER FOIL AND ELECTRODEPOSITED COPPER FOIL
MANUFACTURED THEREBY

Amendment C: REMARKS

Upon entry of the present amendments, previous Claims 23 -31 have been canceled and new Claims 32 - 39 substituted therefor. Claims 1-22 were canceled by a previous amendment. Reconsideration of the rejections, in light of the forgoing amendments and present remarks, is respectfully requested. The present amendments have been entered for the purpose of distinguishing the present invention from the prior art.

In the Office Action, Claims 23 - 31 were now rejected under 35 U.S.C. § 103(a) as being unpatentable over the Wolski patent in view of the Yates patent, the Merchant patent, International Publication No. WO 01/53569 and the Sekiguchi patent. Claim 27 was objected to because of a minor informality.

As an overview to the present reply, Applicant has revised previous Claims 23 -31 in the form of new Claims 32 - 39. In particular, new independent Claim 32 now includes the limitations of previous dependent Claim 28 in that the "gelatin" has a molecular weight of greater than 10000. Dependent Claims 33 - 36 correspond, respectively, to the limitations previous dependent Claims 24 - 27. New dependent Claims 37 - 39 correspond, respectively, to the limitations of previous

dependent Claims 29 - 31.

As an overview to the present reply, Applicant notes that the "gelatin" of the Wolski patent describes a gelatin material having a molecular weight of 10000 or less. This was stated in column 5, lines 50 - 54 as follows:

These commercially available products have weight average molecular weights (Mw) of 10,000 or less and are characterized in that jelly strength is extremely low due to the low molecular weights.

Additionally, independent Claim 1 of the Wolski patent emphasizes the importance of this relatively low molecular weight as "having a molecular weight of 10000 or less".

The original Specification for the present application provides the "prima facie" basis for the molecular weight of being greater than 10000. This was stated in paragraph [0029] of the original specification as follows:

The gelatin used as an additive is a kind of a derived protein and has a molecular weight of above 10000. If the gelatin having molecular weight below 10000 is used, an interaction between SPS and HEC is weakened, so that an electrodeposited copper foil having ununiform roughness and gloss is manufactured. In the case that the molecular weight of the gelatin is above 10000, it is possible to manufacture a low roughness copper foil having a uniform roughness and gloss.

On this basis, Applicant respectfully contends that the limitation of the molecular weight of greater than 10000 has a "prima facie" basis in the present application. As such, Applicant respectfully disagrees with the Examiner's analysis as to the lack of the prima facie basis for such a limitation.

In the method recited in new independent Claim 32, it is specified that the additive, added to the electrolyte solution, contains between 0.1ppm to 100ppm of a gelatin, 0.05ppm to 50ppm of hydroxyethyl cellulose (HEC), and 0.05ppm to 20ppm of bis(sodiumsulfopropyl)disulfide (SPS).

Applicant respectfully contends that none of the prior art references, individually, or in combination, recite an additive that is added to the electrolyte solution and that has this composition. As such, without this additive, the prior art combination would fail to achieve the advantages of the present invention.

The disclosure of the Wolski patent does not disclose the bis(sodiumsulfopropyl)disulfide (SPS). The 3-mercapto-1-propanesulfonate (MPS) of the Wolski patent does not make the choice of SPS obvious. Although there are similar abilities for similar bivalent sulfur organic compounds, the particular selection of SPS is not an obvious choice. The Yates patent discloses even more bivalent sulfur organic compounds, including 2-mercaptobenzothiazole (MBT) and mercaptoethane sulfonic acid (MES).

The SPS is fabricated by combining monomers using the S-S bond, like MPS, MBT, and MES. However, the SPS does not decompose in the same manner as the other bivalent sulfur organic compounds. SPS is not reduced back to the monomer when placed in the claimed solution because the S-S bond of SPS is stronger than the S-S bond of MPS, for example. Additionally, SPS will result in a dimmer shade of foil than other bivalent sulfur organic compounds. As such, the disclosure of the group of bivalent sulfur organic compounds by the prior art does not make the particular selection of SPS obvious for patenting.

Although the Merchant patent discloses SPS, the Merchant patent does not teach the amounts and conditions of the SPS composition of the present invention. As a chemical composition patent application, the existence of SPS is not being claimed, but rather the inventive method for an application of this chemical. The present invention discloses a range of amounts and conditions for the additive that are not made obvious by the prior art combination. As such, independent Claim 32

has been placed into a condition for allowance.

Applicant's attorney also notes that the wide number of reference that are used so as to disclose the various components identified in the new independent Claim 32 is also evidence of the "non obviousness" of independent Claim 32. Fundamentally, Applicant respectfully contends that one having ordinary skill in the art would not be likely to combine the various components of five (5) separate references in order to produce the very low roughness electrodeposited copper foil of the present invention. The references, other than the Wolski patent, fail to show any molecular weight range of gelatin nor the inclusion of such a gelatine in the process of making a very low roughness electrodeposited copper foil. As such, Applicant respectfully contends that the present invention, as defined by independent Claim 32, would not be obvious in view of the prior art references.

Applicant has revised previous dependent Claim 27 (now dependent Claim 36) so as to correct for the informalities identified by the Examiner.

The present amendment is being submitted concurrent with a Petition to Revive. The requisite Petition and fee have been enclosed herewith.

Based upon the foregoing analysis, Applicant contends that independent Claim 32 is now in proper condition for allowance. Additionally, those claims which are dependent upon this independent claim should also be in condition for allowance. Reconsideration of the rejections and

allowance of the claims at an early date is earnestly solicited. Since no new claims have been added above those originally paid for, no additional fee is required.

Respectfully submitted,

December 2, 2008

/Andrew W. Chu/

Date

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